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New synonymy in some Asian species of *Syrrhopodon* (Calymperaceae: Musci)

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SYNOPSIS. *Calymperes dixoconstrictum* B.C. Tan & Mohamed is placed in synonymy with *Syrrhopodon croceus* Mitt., and *Calymperes mussuriense* Dixon in synonymy with *Syrrhopodon gardneri* (Hook.) Schwägr. *Syrrhopodon subelimbatus* Dixon, hitherto erroneously regarded as a synonym of *Syrrhopodon trachyphyllus* Mont., is conspecific with *Syrrhopodon armatus* Mitt.

Syrrhopodon croceus Mitt. in *J. Linn. Soc., Bot.* Suppl. **1**: 41 (1859).
Fig. 1.

Calymperes constrictum Dixon in *Bull. Torrey Bot. Club* **51**: 233 (1924), hom. illeg.

Calymperes dixoconstrictum B.C. Tan & Mohamed in Mohamed & B.C. Tan, *Bryologist* **91**: 29 (1988), syn. nov. Type: Peninsular Malaysia, Selangor, Klang Watercatchment Forest, 12 March 1922, *Burkill 6836* (BM!-holotype).

DISCUSSION. Mohamed & Tan (1988) proposed '*Calymperes dixoconstrictum*' to replace the illegitimate *Calymperes constrictum* Dixon, a combination already published for a different species, i.e. *Calymperes constrictum* Sull. [= *Mitthyridium constrictum* (Sull.) H. Rob.]. Eddy (1990), without mention of Tan & Mohamed's new name, placed *C. constrictum* Dixon in synonymy with *Syrrhopodon loreus* (Sande Lac.) W.D. Reese. However, the holotype of *C. constrictum* (*Burkill* 6836), in Dixon's herbarium (BM), represents an extreme form of *Syrrhopodon croceus* Mitt. that possesses unusually poorly developed shoots and leaves.

In typical material of *Syrrhopodon croceus* Mitt. the leaves are < 5–10 mm long and consist of a narrowly subelliptical base, with entire margins, extending into a linear chlorophyllose limb with a blunt apex (Fig. 1a, c, e) and toothed margins. The hyaline lamina is confined to the proximal region of the base and has a truncate to broadly acute apex. Distally, the lamina in the leaf base is largely composed of thick-walled, porose, orange-red cells (Fig. 1j, k). For a short distance beyond the leaf base the margin usually possesses a row of long, acute teeth; above these, it thickens to form a prominent rib that extends to near the leaf apex. This is composed of stereids enclosed within a unistratose layer of subrectangular cells (Fig. 1l, m). Subtriangular teeth occur at intervals along the rib.

The holotype of *Calymperes constrictum* Dixon (*Burkill* 6836) has leaves which are mostly linear (reaching 5–6 mm long), but some are relatively broad and short with broadly acute apices (Fig. 1b, d), as illustrated by Dixon in the protologue. The hyaline lamina occupies the entire length of the leaf base and possesses an acute apex (Fig. 1h, i). Thick-walled, porose, orange-red cells are all but absent or occur in reduced patches on either side of the hyaline lamina in the upper leaf base (Fig. 1i). In the leaf limb marginal teeth are sometimes obscure or absent, and the layer of subrectangular cells enclosing the thick marginal rib is sometimes missing or poorly developed. All of these features are consistent with those occurring in depauperate, aberrant or juvenile forms of *Syrrhopodon croceus* Mitt. collected elsewhere in southeast Asia. Collections similar to *Burkill* 6836 have been made in the Philippines (*Tan & Tandang* 82-376, FH) and South Kalimantan (*Ellis* 252 pro parte, BO). The latter specimen occurred within a few meters of populations of *S. croceus* with the typical form.

SPECIMENS EXAMINED. **Malay Peninsula**. Negri Sembilan, Pasoh Forest Reserve, Smithsonian 50 Hectare Plot, tree number 62866, March 1995, *Ellis* s.n. (BM). **Philippines**. Luzon Island, Laguna Province, Cavinti, Bo. Lumot, Ubali River, near Sitio Ubali, 24 October 1982, *Tan & Tandang* 82-376 (FH). **Indonesia**. South Kalimantan, Panaan, 01° 36' 44" S, 115° 30' 00.5" E, 29 March 2000, *Ellis* 252 pro parte (BO). **Sarawak**. Fourth/Fifth Division, Gunong Mulu National Park, W. of Sungei Berar Camp, 150 m, 16 March 1978, *Jermy* 13664:13 (BM).

Syrrhopodon gardneri (Hook.) Schwägr., *Sp. musc. frond. suppl.* **2**(1): 110 (1824).

Calymperes mussuriense Dixon, *The 150th anniversary volume of the Royal Botanic Garden, Calcutta*, **1, 2**: 178 (1942), syn. nov. Type: India, Mussooree, Landour, near Woodstock School, 2 July 1922, *Dudgeon* 64 (BM!-holotype).

Syrrhopodon mussuriense Broth. in R.S. Chopra, *Taxonomy of Indian mosses*: 103 (1975), nom. nud. Original specimen: India, below Mussooree, 10 September 1895, *Duthie* s.n. (BM!, BM-K!).

DISCUSSION. Dixon labelled the type specimen of *Calymperes mussuriense* Dixon (*Dudgeon* 64, BM) as '*Syrrhopodon mussooriensis* Dixon, sp. nov.'. The material was never annotated with the published combination. Consequently, *Dudgeon* 64 and two paratypes of *C. mussuriense* (*Sawhney* 236, 250, BM) have hitherto remained unrecognized, and were filed in BM under the unpublished herbarium name. An undated pencilled note on *Dudgeon* 64 by R.S. Chopra correctly identifies it as a form of *Syrrhopodon gardneri* (Hook.) Schwägr.

Syrrhopodon mussuriensis Broth., nom. nud. is apparently based on another collection from Mussooree (*Duthie* s.n.). Coincidentally, the two duplicates of this specimen in BM are also *Syrrhopodon gardneri*.

SPECIMENS EXAMINED. **India.** Kumaon, Thall to Dindihat, June 1926, *Sawhney* 236 (BM), 250 (BM).

Syrrhopodon armatus Mitt. in *J. Linn. Soc., Bot.* **7**: 151 (1863).
Fig. 2.

Syrrhopodon subelimbatus Dixon in *J. Siam Soc., Nat. Hist. Suppl.* **9**(1): 12 (1932), syn. nov. Type: Thailand, Kaw Tao, 300 m, September 1928, *Kerr* 338 (BM!-holotype).

DISCUSSION. Mohamed & Reese (1985) and Menzel & Schultze-Motel (1990) place *Syrrhopodon subelimbatus* Dixon in synonymy

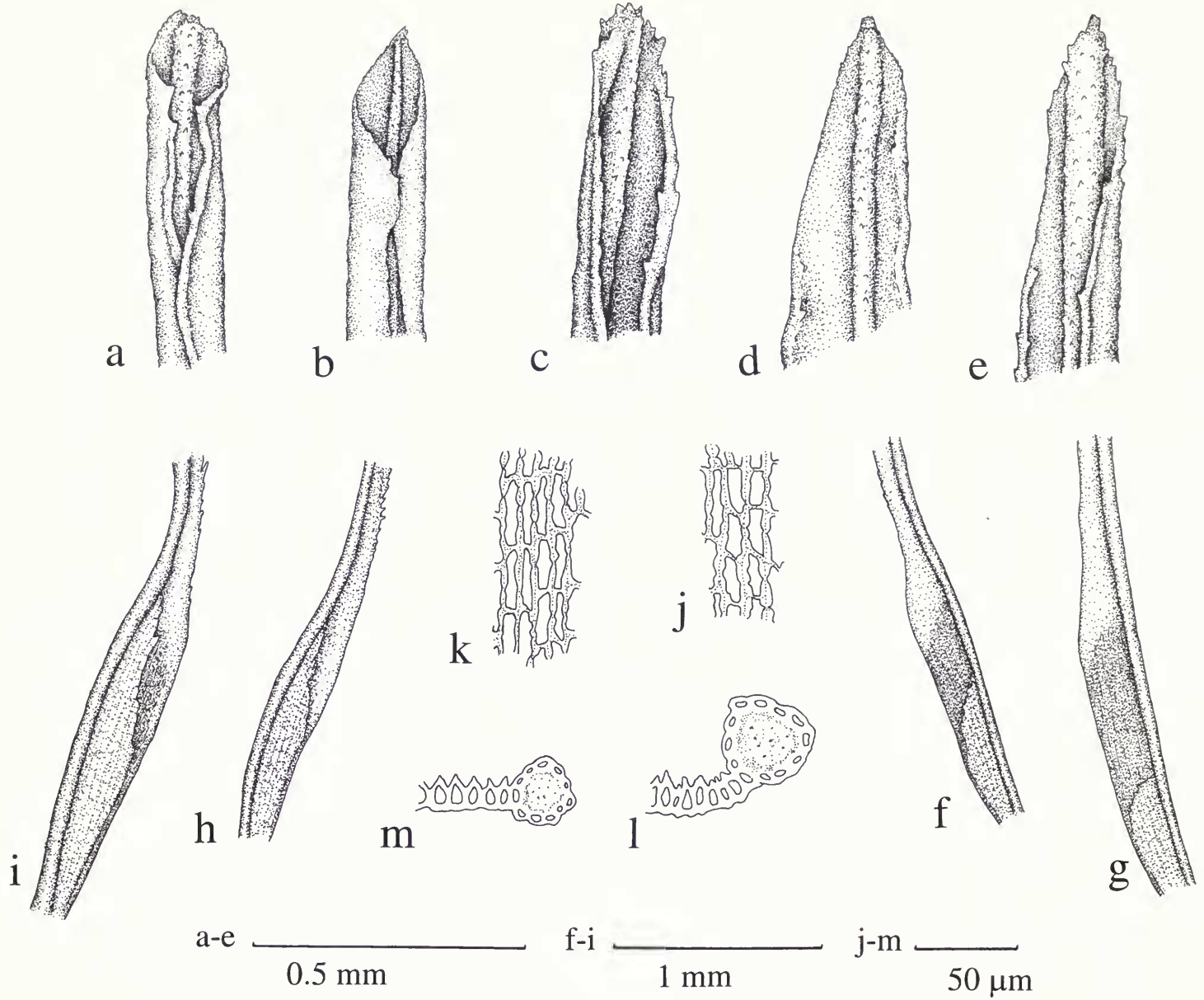

Fig. 1 a–m. *Syrrhopodon croceus* Mitt. a–e: apices of leaves in ventral view (a, c, e: normal leaves, b, d: aberrant leaves); f–i: basal regions of leaves in lateral view (f, g: typical leaves with prominent areas of orange-red cells (shaded areas), h, i: aberrant leaves with reduced to absent groups of orange-red cells); j, k: orange-red cells from distal leaf base (j: normal leaf, k: aberrant leaf): l, m: cross-section of chlorophyllose lamina and marginal rib in leaf limb (l: normal leaf, m: aberrant leaf). a, b, k, i, m Drawn from *Burkill* 6836 (BM); c, f, j Drawn from *Ellis* s.n. (BM); d, e, h Drawn from *Ellis* 252 pro parte (BO); g, l Drawn from *Jermy* 13664:13 (BM).

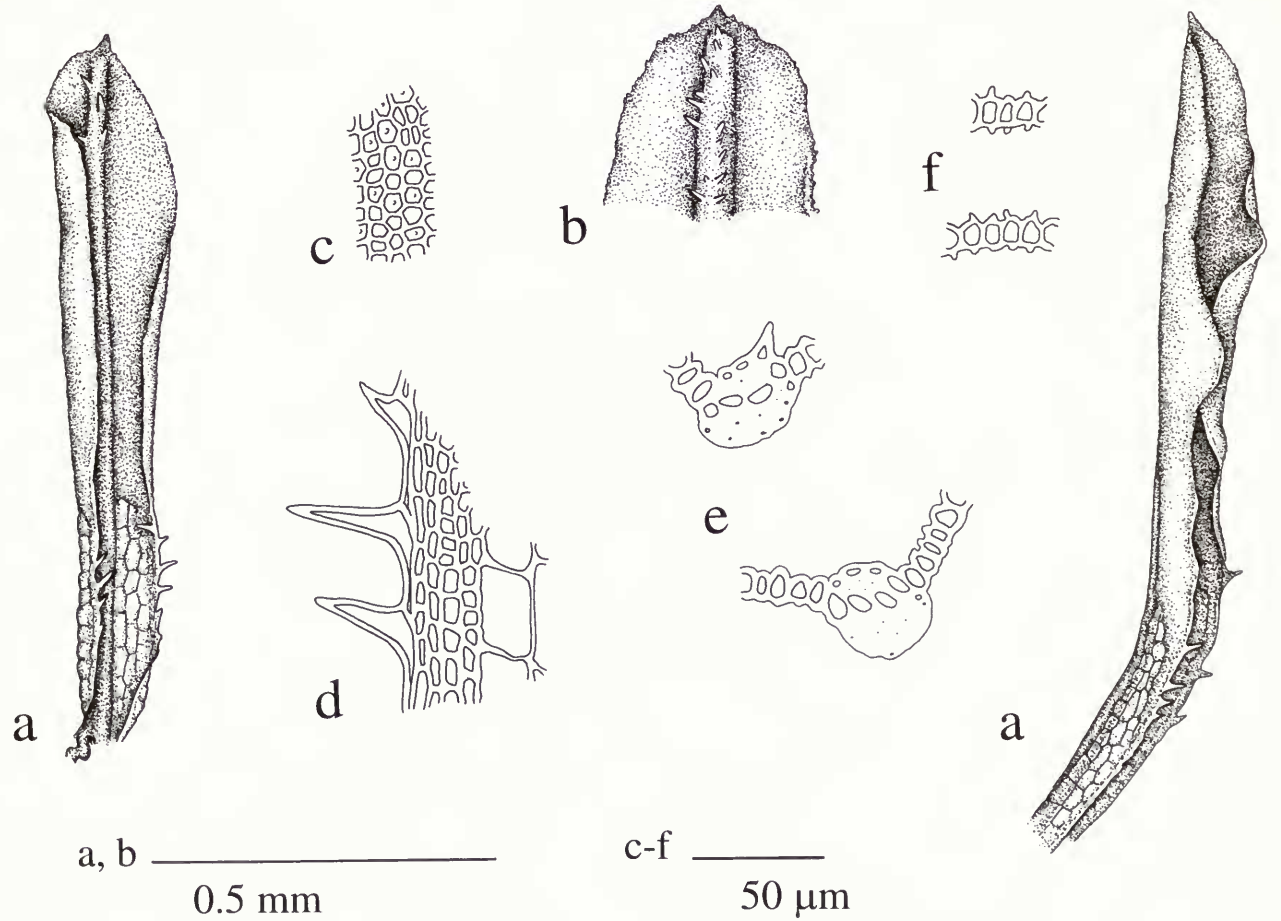

Fig. 2 a–f. *Syrrhopodon armatus* Mitt. a: leaves; b: leaf apex in ventral view showing costal spines; c, d: cells of leaf in surface view (c: chlorophyllose lamina, d: at margin adjacent to the apex of the hyaline lamina); e, f: cross-sections of leaf (e: costa and chlorophyllose lamina in distal leaf, f: chlorophyllose lamina with simple papillae). a–f Drawn from *Kerr* 338, BM.

with *Syrrhopodon trachyphyllus* Mont. However, the holotype material in Dixon's herbarium (*Kerr* 338, BM) represents a form of *Syrrhopodon armatus* Mitt. Tixier (1978) was correct to include *S. subelimbatus* in synonymy with *Syrrhopodon larminatii* Broth. & Paris, the latter now recognized as conspecific with *S. armatus*.

Leaves of specimens of *Syrrhopodon armatus* Mitt. usually possess costae with a partial to continuous superficial layer of chlorophyllose cells, many of which are drawn out as long spines. The cells forming the chlorophyllose lamina are very slightly ventrally protuberant and usually possess a simple papilla on the dorsal and ventral surfaces. In contrast, the leaves of *Syrrhopodon trachyphyllus* Mont. have the surface of the costa smooth and usually formed by stereids. Each cell of the chlorophyllose lamina possesses a crown of papillae on the dorsal and ventral surfaces.

Kerr 338 possesses leaves that more closely resemble those of *Syrrhopodon armatus* (Fig. 2a). Chlorophyllose cells, some drawn out as spines, form the ventral surface of the costa (Fig. 2b, e). However, in most leaves, the dorsal surface of the costa is formed by stereids, a few spines sometimes occurring towards the leaf apex. The cells of the chlorophyllose lamina are unipapillose (Fig. 2f) on the dorsal and ventral surfaces or lack papillae (Fig. 2e). These and all other features of *Kerr* 338 fall within the range of variation found in specimens of *Syrrhopodon armatus*.

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